U.S. Patent Application No.: Unknown

January 18, 2005

Page 5 of 18

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in

the application:

LISTING OF CLAIMS:

Claims 1-26 (canceled).

Claim 27 (new): A surface acoustic wave filter comprising:

a piezoelectric substrate; and

a longitudinally-coupled-resonator surface acoustic wave filter portion provided on

the piezoelectric substrate; wherein

the longitudinally-coupled-resonator surface acoustic wave filter portion includes

an odd number of at least three interdigital transducers arranged such that a plurality of

comb electrodes having a plurality of electrode fingers are interdigitated, the interdigital

transducers being disposed along a surface-acoustic-wave propagation direction, and

first and second reflectors disposed along the surface-acoustic-wave propagation

direction so that the at least three interdigital transducers are located between the first

and second reflectors;

the odd number of at least three interdigital transducers include a central

interdigital transducer arranged in the approximate center, and first and second

interdigital transducers disposed at two sides of the central interdigital transducer, an

electrode finger of the first interdigital transducer which is adjacent to the central

interdigital transducer is a ground electrode, and an electrode finger of the second

interdigital transducer which is adjacent to the central interdigital transducer is a signal

electrode;

U.S. Patent Application No.: Unknown

January 18, 2005

Page 6 of 18

the comb electrodes disposed on one side of the central interdigital transducer

include first and second bisected comb electrodes obtained by bisecting the one of the

opposing comb electrodes along the surface-acoustic-wave propagation direction;

the first and second bisected comb electrodes are respectively displaced toward

the first and second interdigital transducers and are respectively connected to first and

second balanced signal terminals;

the first and second interdigital transducers which are adjacent to the central

interdigital transducer are connected to an unbalanced signal terminal; and

when, in the central interdigital transducer, an imaginary central axis that is

substantially perpendicular to the surface-acoustic-wave propagation direction is

assumed, design parameters of at least one of the interdigital transducers and the

reflectors, which are disposed on opposite sides of the imaginary central axis in the

central interdigital transducer that is substantially perpendicular to the surface-acoustic-

wave propagation direction, are set to be different from one another at the sides of the

imaginary central axis.

Claim 28 (new): The surface acoustic wave filter according to Claim 27, wherein

the at least one of the interdigital transducers and the first and second reflectors, which

are disposed on opposite sides of the imaginary central axis, are asymmetrically

arranged at the sides of the imaginary central axis.

Claim 29 (new): The surface acoustic wave filter according to Claim 27, wherein:

U.S. Patent Application No.: Unknown

January 18, 2005 Page 7 of 18

the polarities of two outermost electrode fingers of the central interdigital

transducer are substantially identical to that of one of the ground electrode and a float

electrode; and

the electrode finger pitch of at least a portion of the first interdigital transducer is

greater than the electrode finger pitch of the second interdigital transducer.

Claim 30 (new): The surface acoustic wave filter according to Claim 27, wherein

the polarities of two outermost electrode fingers of the central interdigital transducer are

substantially identical to that of the signal electrode, and the electrode finger pitch of at.

least a portion of the second interdigital transducer is greater than the electrode finger

pitch of the first interdigital transducer.

Claim 31 (new): The surface acoustic wave filter according to Claim 27, wherein

the electrode finger pitch of at least a portion of the first bisected comb electrode, which

is closer to the first interdigital transducer, is greater than the electrode finger pitch of

the second bisected comb electrode.

Claim 32 (new): The surface acoustic wave filter according to Claim 27, wherein

an adjacent-electrode-finger center-to-center distance between the first interdigital

transducer and the central interdigital transducer is greater than an adjacent-electrode-

finger center-to-center distance between the second interdigital transducer and the

central interdigital transducer.

U.S. Patent Application No.: Unknown

January 18, 2005 Page 8 of 18

Claim 33 (new): The surface acoustic wave filter according to Claim 27, wherein

the polarities of two outermost electrode fingers of the central interdigital transducer are

substantially identical to that of a ground electrode or a float electrode, and an

electrode-finger center-to-center distance between the first interdigital transducer and

the first reflector adjacent to the first interdigital transducer is greater than an electrode-

finger center-to-center distance between the second interdigital transducer and the

second reflector adjacent to the second interdigital transducer.

Claim 34 (new): The surface acoustic wave filter according to Claim 27, wherein

the polarities of two outermost electrode fingers of the central interdigital transducer are

substantially identical to that of a signal electrode, and an electrode-finger center-to-

center distance between the second interdigital transducer and the second reflector

adjacent to the second interdigital transducer is greater than an electrode-finger center-

to-center distance between the first interdigital transducer and the first reflector adjacent

to the first interdigital transducer.

Claim 35 (new): The surface acoustic wave filter according to Claim 27, wherein

the duty of electrode fingers in at least a portion of the first interdigital transducer is

greater than the duty of electrode fingers of the second interdigital transducer.

Claim 36 (new): The surface acoustic wave filter according to Claim 27, wherein

the polarities of two outermost electrode fingers of the central interdigital transducer are

substantially identical to that of a ground electrode or a float electrode, and the duty of

U.S. Patent Application No.: Unknown

January 18, 2005

Page 9 of 18

electrode fingers of the first bisected comb electrode is greater than the duty of

electrode fingers of the second bisected comb electrode.

Claim 37 (new): The surface acoustic wave filter according to Claim 27, wherein

two outermost electrode fingers of the central interdigital transducer are signal

electrodes, and the duty of electrode fingers of the second bisected comb electrode is

greater than the duty of electrode fingers of the first bisected comb electrode.

Claim 38 (new): The surface acoustic wave filter according to Claim 27, wherein:

the odd number of at least three interdigital transducers has, in areas in which

two interdigital transducers are adjacent to each other, narrow pitch electrode finger

portions having smaller electrode finger pitches than with surrounding electrode finger

portions; and

the electrode finger pitch of one narrow pitch electrode finger portion in an area

in which the first interdigital transducer and the first bisected comb electrode are

adjacent to each other is greater than the electrode finger pitch of one narrow pitch

electrode finger portion in an area in which the second interdigital transducer and the

second bisected comb electrode are adjacent to each other.

Claim 39 (new): A surface acoustic wave filter comprising:

a piezoelectric substrate; and

a longitudinally-coupled-resonator surface acoustic wave filter portion disposed

on the piezoelectric substrate; wherein

U.S. Patent Application No.: Unknown

January 18, 2005 Page 10 of 18

the longitudinally-coupled-resonator surface acoustic wave filter portion includes

an odd number of at least three interdigital transducers arranged such that a plurality of

comb electrodes having a plurality of electrode fingers are interdigitated, the interdigital

transducers being disposed along a surface-acoustic-wave propagation direction, and

first and second reflectors disposed along the surface-acoustic-wave propagation

direction such that the at least three interdigital transducers are located between both

reflectors;

the odd number of at least three interdigital transducers includes a central

interdigital transducer arranged in the approximate center, and first and second

interdigital transducers disposed at two sides of the central interdigital transducer, an

electrode finger of the first interdigital transducer which is adjacent to the central

interdigital transducer is a ground electrode, and an electrode finger of the second

interdigital transducer which is adjacent to the central interdigital transducer is a signal

electrode;

the comb electrodes disposed on one side of the central interdigital transducer

include first and second bisected comb electrodes obtained by bisecting the one of the

opposing comb electrodes along the surface-acoustic-wave propagation direction;

the first and second bisected comb electrodes are respectively displaced toward

the first and second interdigital transducers and are respectively connected to first and

second balanced signal terminals;

the first and second interdigital transducers which are adjacent to the central

interdigital transducer are connected to an unbalanced signal terminal;

the surface acoustic wave filter further includes first and second surface acoustic

wave resonators respectively connected between the first interdigital transducer and the

U.S. Patent Application No.: Unknown

January 18, 2005

Page 11 of 18

unbalanced signal terminal and between the second interdigital transducer and the

unbalanced signal terminal;

each of the first and second surface acoustic wave resonators includes an

interdigital transducer and reflectors disposed at two sides of the interdigital transducer

in the surface-acoustic-wave propagation direction; and

design parameters of the first and second surface acoustic wave resonators are

different from one another.

Claim 40 (new): The surface acoustic wave filter according to Claim 39, wherein

the electrode finger pitch of at least a portion of the first surface acoustic wave

resonator is greater than the electrode finger pitch of the second surface acoustic wave

resonator.

Claim 41 (new): The surface acoustic wave filter according to Claim 39, wherein

a ratio between the electrode finger pitch of the interdigital transducer of the first surface

acoustic wave resonator and the electrode finger pitch of one reflector of the first

surface acoustic wave resonator is greater than a ratio between the electrode finger

pitches of the interdigital transducer and one reflector in the second surface acoustic

wave resonator.

Claim 42 (new): The surface acoustic wave filter according to Claim 39, wherein

an electrode-finger center-to-center distance between the interdigital transducer and

one reflector in the first surface acoustic wave resonator is greater than an electrode-

U.S. Patent Application No.: Unknown

January 18, 2005

Page 12 of 18

finger center-to-center distance between the interdigital transducer and one reflector in

the second surface acoustic wave resonator.

Claim 43 (new): The surface acoustic wave filter according to Claim 39, wherein

the duty of electrode fingers of the second surface acoustic wave resonator is greater

than the duty of electrode fingers of the first surface acoustic wave resonator.

Claim 44 (new): A surface acoustic wave filter comprising:

a piezoelectric substrate; and

a longitudinally-coupled-resonator surface acoustic wave filter portion disposed

on the piezoelectric substrate; wherein

the longitudinally-coupled-resonator surface acoustic wave filter portion includes

an odd number of at least three interdigital transducers arranged such that a plurality of

comb electrodes having a plurality of electrode fingers are interdigitated, the interdigital

transducers being disposed along a surface-acoustic-wave propagation direction, and

first and second reflectors disposed along the surface-acoustic-wave propagation

direction such that the at least three interdigital transducers are located between the

first and second reflectors;

the odd number of at least three interdigital transducers includes a central

interdigital transducer located in the approximate center, and first and second

interdigital transducers disposed at two sides of the central interdigital transducer, an

electrode finger of the first interdigital transducer which is adjacent to the central

interdigital transducer is a ground electrode, and an electrode finger of the second

U.S. Patent Application No.: Unknown

January 18, 2005

Page 13 of 18

interdigital transducer which is adjacent to the central interdigital transducer is a signal

electrode;

the comb electrodes disposed on one side of the central interdigital transducer

include first and second bisected comb electrodes obtained by bisecting the comb

electrodes along the surface-acoustic-wave propagation direction;

the first and second bisected comb electrodes are respectively displaced toward

the first and second interdigital transducers and are respectively connected to first and

second balanced signal terminals;

the first and second interdigital transducers which are adjacent to the central

interdigital transducer are connected to an unbalanced signal terminal;

the surface acoustic wave filter further includes first and second surface acoustic

wave resonators respectively connected between the first interdigital transducer and the

unbalanced signal terminal and between the second interdigital transducer and the

unbalanced signal terminal;

each of the first and second surface acoustic wave resonators include an

interdigital transducer and reflectors disposed at two sides of the interdigital transducer

in the surface-acoustic-wave propagation direction; and

design parameters of the first and second surface acoustic wave resonators are

different from one another.

Claim 45 (new): The surface acoustic wave filter according to Claim 44, wherein

the electrode finger pitch of at least a portion of the first surface acoustic wave

resonator is greater than the electrode finger pitch of the second surface acoustic wave

resonator.

U.S. Patent Application No.: Unknown

January 18, 2005 Page 14 of 18

Claim 46 (new): The surface acoustic wave filter according to Claim 44, wherein a

ratio between the electrode finger pitches of the interdigital transducer and one reflector

in the first surface acoustic wave resonator is greater than a ratio between the electrode

finger pitches of the interdigital transducer and one reflector in the second surface

acoustic wave resonator.

Claim 47 (new): The surface acoustic wave filter according to Claim 44, wherein

an electrode-finger center-to-center distance between the interdigital transducer and

one reflector in the first surface acoustic wave resonator is greater than an electrode-

finger center-to-center distance between the interdigital transducer and one reflector in

the second surface acoustic wave resonator.

Claim 48 (new): The surface acoustic wave filter according to Claim 44, wherein

the duty of electrode fingers of the second surface acoustic wave resonator is greater

than the duty of electrode fingers of the first surface acoustic wave resonator.

Claim 49 (new): The surface acoustic wave filter according to Claim 27, further

comprising a second longitudinally-coupled-resonator surface acoustic wave filter

portion cascade-connected to said longitudinally-coupled-resonator surface acoustic

wave filter portion.

Claim 50 (new): The surface acoustic wave filter according to Claim 39, further

comprising a second longitudinally-coupled-resonator surface acoustic wave filter

U.S. Patent Application No.: Unknown

January 18, 2005

Page 15 of 18

portion cascade-connected to said longitudinally-coupled-resonator surface acoustic

wave filter portion.

Claim 51 (new): The surface acoustic wave filter according to Claim 44, further

comprising a second longitudinally-coupled-resonator surface acoustic wave filter

portion cascade-connected to said longitudinally-coupled-resonator surface acoustic

wave filter portion.

Claim 52 (new): The surface acoustic wave filter according to Claim 49, wherein

the second longitudinally-coupled-resonator surface acoustic wave filter portion includes

a central interdigital transducer and first and second interdigital transducers disposed at

two sides of the central interdigital transducer, and the number of electrode fingers of

the central interdigital transducer is even.

Claim 53 (new): The surface acoustic wave filter according to Claim 50, wherein

the second longitudinally-coupled-resonator surface acoustic wave filter portion includes

a central interdigital transducer and first and second interdigital transducers disposed at

two sides of the central interdigital transducer, and the number of electrode fingers of

the central interdigital transducer is even.

Claim 54 (new): The surface acoustic wave filter according to Claim 51, wherein

the second longitudinally-coupled-resonator surface acoustic wave filter portion includes

a central interdigital transducer and first and second interdigital transducers disposed at

U.S. Patent Application No.: Unknown

January 18, 2005

Page 16 of 18

two sides of the central interdigital transducer, and the number of electrode fingers of

the central interdigital transducer is even.

Claim 55 (new): The surface acoustic wave filter according to Claim 49, further

comprising:

a first signal line for electrically connecting the first interdigital transducer of the

second longitudinally-coupled-resonator surface acoustic wave filter portion and the first

or second interdigital transducer of said longitudinally-coupled-resonator surface

acoustic wave filter portion; and

a second signal line for electrically connecting the second interdigital transducer

of the second longitudinally-coupled-resonator surface acoustic wave filter portion and

the second or first interdigital transducer of said longitudinally-coupled-resonator

surface acoustic wave filter portion; wherein the phases of signals transmitted through

the first and second signal lines have a difference of approximately 180 degrees.

Claim 56 (new): The surface acoustic wave filter according to Claim 50, further

comprising:

a first signal line for electrically connecting the first interdigital transducer of the

second longitudinally-coupled-resonator surface acoustic wave filter portion and the first

or second interdigital transducer of said longitudinally-coupled-resonator surface

acoustic wave filter portion; and

a second signal line for electrically connecting the second interdigital transducer

of the second longitudinally-coupled-resonator surface acoustic wave filter portion and

the second or first interdigital transducer of said longitudinally-coupled-resonator

U.S. Patent Application No.: Unknown

January 18, 2005 Page 17 of 18

surface acoustic wave filter portion; wherein the phases of signals transmitted through

the first and second signal lines have a difference of approximately 180 degrees.

Claim 57 (new): The surface acoustic wave filter according to Claim 51, further

comprising:

a first signal line for electrically connecting the first interdigital transducer of the

second longitudinally-coupled-resonator surface acoustic wave filter portion and the first

or second interdigital transducer of said longitudinally-coupled-resonator surface

acoustic wave filter portion; and

a second signal line for electrically connecting the second interdigital transducer

of the second longitudinally-coupled-resonator surface acoustic wave filter portion and

the second or first interdigital transducer of said longitudinally-coupled-resonator

surface acoustic wave filter portion; wherein the phases of signals transmitted through

the first and second signal lines have a difference of approximately 180 degrees.

Claim 58 (new): A communication apparatus including the surface acoustic wave

filter as defined in Claim 27.

Claim 59 (new): A communication apparatus including the surface acoustic wave

filter as defined in Claim 39.

Claim 60 (new): A communication apparatus including the surface acoustic wave

filter as defined in Claim 44.